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REMARKS

Reconsideration and further examination is respectfully requested.

The disclosure was objected to for various informalities. Applicant has amended the specification to overcome these formalities, and would like to thank the Examiner for pointing out the informalities with suggested corrections. In view of Applicant's amendments, the objection has been overcome and should be withdrawn.

Claim 4 was objected to due to a typographic error. Applicant's have amended claim 4 to overcome this ground of objection and therefore submit that the objection should be withdrawn.

Claim 1 was provisionally rejected under the judicially created doctrine of obviousness type double patenting as being unpatentable over claim 1 of co-pending application no US2002/0109873 A1. The examiner has indicated that 1) this is a provisional rejection and 2) that it can be overcome with the timely filing of a terminal disclaimer. Given that the scope of allowable subject matter is still in dispute, Applicants have not filed a terminal disclaimer at this point in the proceedings, but will do so if the double patenting rejection is maintained once the scope of the allowable claim is resolved.

Claims 1-4 were rejected under 35 U.S.C. §102(b) as anticipated by Brzozowski et al. Claim 4 was alternatively rejected under 35 U.S.C. §103 as obvious over Brzozowski.

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Applicant's note that a rejection under 35 U.S.C. §102(b) is applicable "if the activity occurred more than 1 year prior to the effective filing date of the application". M.P.E.P. 706.02 The publication date of the reference "Photonic Crystals for Integrated Optical Computing" by Brzozowski et al, is June 2000. The effective filing date of the present application is the date of the provisional filing for this case, which is February 9, 2001. Because the publication date of Brzozowski is less than one year from the effective filing date of the present application, the rejections under 35 U.S.C. 102(b) and 35 U.S.C. §103 regarding Brzozowski are improper and should be withdrawn.

Claims 1 and 3-4 were rejected under 35 U.S.C. §102(b) as being anticipated by Smith, U.S. Patent 4,507,776.

Smith, U.S. Patent 4,507,776:

Smith describes a nonlinear optical time-division multiplexer and demultiplexer formed from a cascaded plurality of triggerable optical switching elements. The exemplary triggerable optical switching element comprises a nonlinear optical material disposed in a ring resonator arrangement. The triggerable optical switching element includes a nonlinear optical material 20 and an arrangement of mirrors 22, 24 and 26.

Applicants submit that Smith neither describes nor suggests the limitations of the claimed invention. Claim 1 recites "...An optical logic device for processing information optically using the transmitted and/or reflected characteristics of at least one stable, non-absorbing optical hard

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limiter..." Applicants can find no mention in Smith of the use of "one stable, non-absorbing optical hard limiter..." and assert that the Examiner has not given patentable weight to the "stable, non-absorbing optical hard limiter" element of the claims.

The Office action states "... Smith discloses an optical logic device for processing information optically using the transmitted and/or reflected characteristics of at least one stable, non-absorbing optical hard limiter (See Figures 1-5; col. 2, line 46-col. 5 line 24). ..." In accordance with MPEP §2106 Patentability "Office personnel must rely on Appellant's disclosure to properly determine the meaning of terms used in the claims". *Markman v. Westview Instruments*, 52 F.3d 967, 980, 34 USPQ2d 1321, 1330 (Fed. Cir.) (en banc), aff'd, U.S. 116 S. Ct. 1384 (1996). An Appellant is entitled to be his or her own lexicographer, and in many instances, such as in the present application, will provide an explicit definition for terms used in the claims. In particular, the Examiner is referred to page 5, lines 5-25 of the specification of the instant case for the definition of 'optical hard limiter'. Such a structure is not shown or suggested in Smith.

The Office Action further states, with regard to claim 3 "... Smith additionally discloses the transmitted characteristics of the hard limiter comprising a first range, a second range, and a third range, the ranges being defined as recited in Claim 3 of the instant application (See Figure 3; col. 3, lines 5-37)..."

In the portion of text identified by the Examiner, Smith describes the input/output characteristic of the non-linear optical device. In particular, Smith states, at line 12-22:

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“... In accordance with the present invention, bistable non-linear optical device 15 comprises a nonlinear material 20 whose refractive index is a function of intensity of light passing therethrough, and can be represented by the following equation:

$$n(I) = n_0 + n_2 I$$

where n_0 is the refractive index at zero intensity, n_2 is the nonlinear coefficient of nonlinear material 20, and I is the intensity of light within material 20. The input/output characteristic of nonlinear optical device 15 is illustrated in Fig. 3...” Figure 3 shows a graph of input pulse intensity vs. output, illustrating the output based on the two input signals. Smith further describes, at col. 3 lines 65- col. 4 lines 4: “... the intensity-dependent nature of the refractive index of nonlinear optical material 20 functions to tune the length of the resonator by changing the effective length of the resonator. At the critical intensity, the resonator switches from reflecting to transmitting. Thus, when the trigger signal is not applied, pulses A are reflected and appear at the output and when the trigger signal is applied pulses B are transmitted and appear at the output...”

In contrast, claim 3 recites “...The optical logic device of claim 1, wherein the transmitted characteristics of a stable, non-absorbing optical hard limiter comprise ... a first range bounded by input signals in the range of approximately zero to I_1 in which the transmitted output signal of the stable, non-absorbing optical hard limiter is approximately zero... a second range bounded by input signals in the range approximately from the I_1 to I_2 in which the transmitted output signal of the stable, non-absorbing optical hard limiter increases zero to I_2 ... and a third range bounded by input signals in the range above approximately I_2 in which the transmitted output signal of the stable, non-absorbing optical hard limiter is approximately I_2 ,

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where I_1 is approximately half of I_2 ..." No such structure is shown or described in Smith having the above relationship and wherein I_1 is approximately half of I_2 ..." Accordingly, for at least this reason claim 3 is patentably distinct over Smith and the rejection should be withdrawn.

Claim 4 includes limitations similar to claim 3, except that they are for reflected characteristics. The Office action states "... by the law of conservation of energy, the input intensity to the hard limiter must equal the sum of the energy absorbed, reflected and transmitted. Since the hard limiter is ideally a non-absorbing hard limiter, the input energy equals the sum of the output energy that is reflected and transmitted..."

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). Although the law allows for some degree of inherency, applicants submit that the Examiner is overreaching in the conclusion drawn with respect to the reflective characteristics of the circuit of Smith. In particular, Applicants note that the *only* mention of 'non-absorbing' is in the Applicant's own teachings, *not* the Smith disclosure. For at least the reason that Smith neither describes nor suggests the reflective characteristics of the optical hard limiter as recited in claim 4, claim 4 is patentably distinct over Smith and the rejection should be withdrawn.

Claim 2 was rejected under 35 U.S.C. §103 as being unpatentable over Smith in view of Cuykendall et al, U.S. Patent 4,965,760. Cuykendall describes a saturated optical interaction gate useful in all-optical computing circuits.

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Claim 2 recites "...The optical logic device of claim 1, wherein at the least one stable, non-absorbing optical hard limiter comprises alternating layers of materials with different linear indices and oppositely signed Kerr coefficients..." Although Cuykendall describes layered Kerr coefficients, it is unclear to Applicant how the device of Smith could be modified to include this substance. However, even if Smith were modified to include the limitations of Cuykendall, the combination would still neither describe nor suggest one stable, non-absorbing optical hard limiter of independent claim 1. For at least this reason, Claim 2 is patenably distinct over Smith, Cuykendall and the combination thereof, and the rejection should be withdrawn.

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Applicants have made a diligent effort to place the claims in condition for allowance. However, should there remain unresolved issues that require adverse action, it is respectfully requested that the Examiner telephone Lindsay McGuinness, Applicants' Attorney at 978-264-6664 so that such issues may be resolved as expeditiously as possible.

For these reasons, and in view of the above amendments, this application is now considered to be in condition for allowance and such action is earnestly solicited.

Respectfully Submitted,

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Date


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